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Spermatocyte chromosomes of five lycaenid butterflies of Japan (Lepidoptera, Lycaenidae)

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Summary

Spermatocyte chromosomes in testis sections of five Japanese Lycaenidae taxa have been examined. Two of these five taxa are characterised by an *n*, 24-karyotype. The chromosome constitution of the two allied taxa of *Narathura* studied is markedly distinct : *n*, 14 and 24, respectively.

Résumé

Les auteurs ont étudié les chromosomes des spermatocytes dans des coupes de testicules de cinq taxons de Lycaenidae japonaises. Deux de ces cinq taxons se caractérisent par un caryotype *n*, 24. La constitution chromosomique des deux taxons voisins de *Narathura* est nettement différente : *n*, 14 et 24.

Recently, Saitoh *et al.* (1991) made a chromosome survey in eight taxa of the Lycaenidae of Japan. The present study is its continuation and this paper reports some chromosomal aspects of five other taxa of Japanese lycaenids. Previously, the number of haploid chromosomes was preliminarily recorded by Maeki (1953) for two of these five, *Curetis acuta paracuta* Nicéville, 1901 and *Narathura japonica japonica* (Murray, 1875). Chromosomes of the remaining three, *Narathura bazalus turbata* (Butler, 1882), *Panchala ganesa loomisi* (H. Pryer, 1886) and *Lycaeides argyrognomon praeterinsularis* (Verity, 1921), are studied here for the first time.

Material and methods

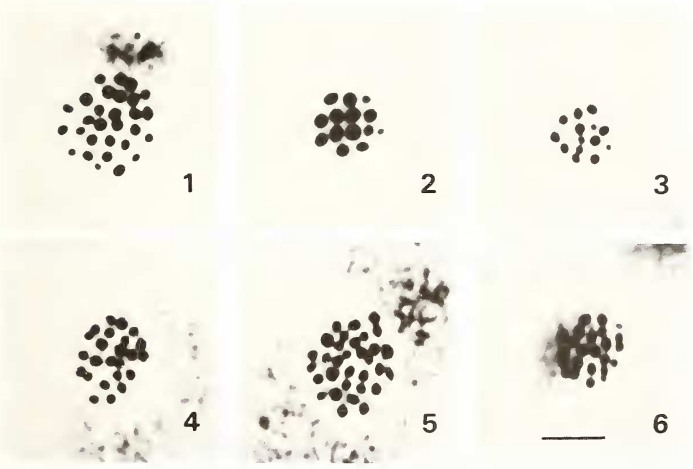
Testes of adults were fixed in Allen's P.F.A.-3 mixture and testis sections, 10 μm in thickness, were stained with Heidenhain's iron-haematoxylin. The scientific names revised by Inomata (1990) are used in this paper. The localities and the details of chromosome counts are shown in Table 1.

Table 1. Chromosome survey in five lycaenids of Japan.

Taxon	Locality	No. of males used for chromosome counting	No. of metaphases examined in First division	Second division	Chromosome number (*n*)
Curetis acuta paracuta	Shibakawa-chô Shizuoka-ken	2	14	11	29
	Shimizu-shi	2	25	7	
Narathura bazalus turbata	Fukuoka-shi	2	9	14	
	Kitakata-chô Miyazaki-ken	1	21	19	14
	Nobeoka-shi	3	48	43	
N. japonica japonica	Fukuoka-shi	1	16		
	Nobeoka-shi	2	20		24
Panchala ganesa loomisi	Kamogawa-shi	5	75	2	32
Lycaeides argyrognomon praeterinsularis	Shizuoka-shi	1	6		24

Observations

As shown in the table, the haploid chromosome numbers established range from 14 to 32. Variation in the haploid number of each taxon is not observed. The inspected specimens of *C. acuta paracuta* and the *Narathura* taxa from two or three localities did not show any inter-population differences in chromosome number (Table 1). The haploid numbers of the *Narathura* taxa are markedly distinct ; 14 in *N. bazalus turbata* and 24 in *N. j. japonica*. No chromosomes with remarkable behaviour are observed in the present material. Metaphase chromosomes assume a round, or somewhat oval shape in polar view, as usually seen in testis sections of lepidopterans. Representative metaphase configurations of each taxon are shown in Figs 1-6. Occurrence of two small-sized elements is always observed in *N. bazalus turbata* : their distinction is easy especially in the second division (Fig. 3). Such elements are not observed in the haploid complement of *N. j. japonica*. In *Panchala ganesa loomisi*, several (four or five) elements are larger in size than the rest (Fig. 5).



Figs 1-6. Spermatocyte chromosomes of five lycaenid butterflies of Japan. 1. *Curetis acuta paracuta*, first division (n, 29) ; 2. *Narathura bazalus turbata*, first division (n, 14) ; 3. Same species, second division (n, 14) ; 4. *N. j. japonica*, first division (n, 24) ; 5. *Panchala ganesa loomisi*, first division (n, 32) ; 6. *Lycaeides argyrognomon praeterinsularis*, first division (n, 24). Scale bar represents ca. 5 μm.

Remarks

The present study confirms the haploid numbers of *C. acuta paracuta* (29) and *N. j. japonica* (24) recorded by Maeki (1953). It is well-known that the two taxa of *Narathura* examined in the present study and *Panchala ganesa loomisi* are similar in external appearance. In fact, they had all once been treated as members of the genus *Arhopala*. The present study, however, demonstrates that their chromosome constitution is strikingly distinct (Table 1 ; Figs 2-5). Measurement of the amount of nuclear 1C DNA might further help the phyloanalysis of these three taxa. The Australian relative, *Narathura micale amphis*, has an n, 24 (♂)-karyotype (Maeki and Ogata, 1971). Thus, two divergent haploid numbers, 14 and 24, have hitherto been recorded for the genus *Narathura* which comprises a large number of species of similar appearance, Therefore, investigation of the karyotypes of additional taxa of this genus is necessary. The haploid number, 14, of *N. bazalus turbata* is the lowest in the lycaenids of Japan which have been cytologically examined. The haploid number, 24, is common to the studied members of *Lycaeides* (Lorković, 1941 ; de Lesse, 1960 ; Maeki & Remington, 1960). It is regarded as a modal haploid number of the family Lycaenidae.

In comparison with this modal number (24), increased (29 and 32), or decreased (14) numbers of haploid chromosomes have been noted in three of the five lycaenids studied here (Table 1). Such numerical deviations might be an indication of their phylogenetic peculiarity.

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